

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) Modular and software definable pre-amplifier apparatus ~~used to perform audio signal conditioning before being output to power amplification and/or headset means~~ comprising:

(a) one or a plurality of software and/or firmware definable logic blocks, these logic blocks being based on ~~Programmable Logic Devices (PLDs), such as Field Programmable Gate Arrays (FPGAs)~~ programmable logic devices, which can be ~~are~~ configured in at least one of real time and ~~or~~ non real time to implement in hardware different signal processing functions required for at least one of different digital signal processing algorithms and ~~or~~ different audio processing protocols, such as ~~Dolby noise reduction, AC3, MPEG2, MP3, MPEG4, Home Theatre, various types of digital filters,~~ thus allowing the apparatus to be used in different audio system configurations, the programmable logic optionally providing hardware acceleration of complex and software intensive functions, the configuration of the software definable logic blocks being performed by either firmware configuration data stored in local memory associated with the programmable logic devices and/or by the

host processor transferring the configuration data to the programmable logic devices directly or indirectly to local memory associated with the programmable logic devices or via a JTAG port of the programmable logic device, the choice of configuration ~~firmware~~ program depending on the user selected parameters, ~~these parameters being entered into the apparatus via either an integrated keypad and front panel controls and or via remote control means, or personal computer means, the input information being displayed on display means, such as an Liquid Crystal Display (LCD), the software definable logic blocks optionally incorporating digital signal processor (DSP) devices and associated memory devices, the configuration and allocation of the software programs used by each digital signal processor device being performed in real time and or non real time by the host processor or configuration routines stored in non volatile memory associated with the digital signal processors, the allocation of the specific software program being determined by user inputs; and~~

(b) a host processor and associated program memory means for controlling, monitoring and configuring the apparatus.

2. (currently amended) Modular and software definable pre-amplifier apparatus as claimed in claim 1, having further comprising integrated memory means, such as a hard disk drive

memory means and or non-volatile semiconductor memory means and or volatile semiconductor memory means for storing and retrieving ~~digitised~~digitized audio data signals.

3. (currently amended) Modular and software definable pre-amplifier apparatus as claimed in Claim 1, further comprising ~~having mezzanine and/or card modules which allow~~ ~~s that~~ allowing the apparatus to be expanded or ~~upgrade~~upgraded for use with other protocols or for adding more audio output channels and or accommodating more source channel interfaces, is accomplished by interfacing mezzanine or card modules to the apparatus, these mezzanine and/or card modules containing any combination of the following circuitry:

- 1) Digital Signal Processors,
- 2) Memory,
- 3) Programmable Logic Devices (PLDs)
- 4) Interface logic,
- 5) Analogue to Digital Converter (ADC),
- 6) Digital to Analogue Converter (DAC),
- 7) Small signal amplification and ~~or~~ filter circuitry.

4. (currently amended) Modular and software definable pre-amplifier apparatus as claimed in Claim 1, which includes further comprising modem means, allowing Internet access so the user ~~to~~can download upgrade firmware or software

for implementing new audio protocols and/or configuring the programmable logic hardware, ~~and or signal processing algorithms~~ allowing the programmable logic and processing elements in the apparatus to be reconfigured to implement the new algorithms and/or hardware configurations, the new firmware and software being stored in non-volatile memory under the control of the host processor and controller circuitry, the Internet access also allows the user to download audio information, such as MP3 data, which ~~can~~ is then be processed and ~~optionally~~ stored by the apparatus ~~before~~ being output to other apparatus, such as a power amplifier and ~~or~~ headset.

5. (currently amended) Apparatus as claimed in Claim 1,
~~further comprising which has the facilities to allow removable memory means containing non-volatile memory such as a PC TYPE 1 2 / 3 card or memory stick~~ to be inserted into the apparatus and removed from the apparatus, previously stored data being read from the removable memory means and processed by the apparatus ~~before being output, alternatively~~ or processed music data and/or digitised ~~digitized~~ audio signals, formatted in ~~the~~ a selected format, ~~can be~~ are stored in ~~the~~ non-volatile memory, ~~in the removable memory card~~ allowing the user to play the recorded data on another apparatus which has the

facilities to access the data stored on the removable memory
~~and~~ means.

6. (currently amended) Apparatus as claimed in Claim 1,
~~wherein in which~~ the software and/or firmware definable
~~devices logic blocks~~ are full custom VLSI devices and/or
Application Specific Integrated Circuits (ASICs) which
implement any Combination of programmable logic, fixed
standard cell logic, mixed signal circuitry and processor
cores.

7. (currently amended) Apparatus as claimed in Claim 1, ~~in~~
~~which the~~further comprising input circuitry and/or output
circuitry ~~is based on programmable logic devices, such as~~
~~Field Programmable Gate Arrays (FPGAs), allowing the~~
interfaces to be reconfigured to implement the desired
interface protocol or format.

8. (currently amended) Apparatus as claimed in Claim 1,
~~wherein in which~~ the apparatus ~~can be~~is configured for
simultaneous use by more than one user where signal data from
one or more signal sources ~~can be~~is processed and output to
one or more output circuits.

9. (currently amended) Apparatus as claimed in Claim 1,
wherein in which an external modem means is employed to access
the Internet.

10. (currently amended) Apparatus as claimed in Claim 1,
wherein which uses feedback signals are provided from remote
microphone means to allow the signal processing means processor
devices to adapt in real time the sound of the played music to
the desired acoustical settings.

11. (currently amended) Apparatus as claimed in Claim 1 which
incorporates analogue to Digital digital converter (ADC) means
to allow analogue input signals to be first converted to
digital signals so they can be and processed in the digital
domain, the sampling frequency of the Analogue analogue to
Digital digital Converter) converter means (ADCs) being
sufficient to accurately represent the signal in the digital
domain.

12. (currently amended) Apparatus as claimed in Claim 1,
wherein in which the input signals signals to the apparatus from
source means and/or the output signals from the apparatus to
signal sink means is by wireless communication means.

13. (currently amended) Apparatus as claimed in claim 12,
~~wherein in which the wireless protocol used to transfer of~~
data to and from the pre-amplifier apparatus is according to
Bluetooth, HomeRF, IEEE 802.11, DECT or Wireless ATM protocol.

14. (currently amended) Apparatus as claimed in Claim 3
wherein the mezzanine ~~card and/or card module~~modules have
interface means ~~are~~—based on programmable logic, ~~for example~~
~~Field Programmable Logic Arrays (FPGAs)~~ so that upgrades can
~~be~~ easily implemented by changing the interface
~~devices~~means of the associated mezzanine or card module and/or
mezzanine card.

15. (currently amended) Apparatus as claimed in Claim 1, ~~in~~
~~which~~wherein the ~~signal processing logic~~ blocks are programmed
and ~~or~~ configured to implement reverberation and echo effects.

16. (currently amended) Apparatus as claimed in Claim 1,
~~wherein~~which the ~~signal processing logic~~ blocks are programmed
and ~~or~~ configured to emulate the acoustic characteristics of a
valve amplifier and alter the output signals so they sound as
if they were produced by a valve amplifier.

17. (currently amended) Apparatus as claimed in Claim 1,
~~wherein~~ in which a personal computer (PC) ~~can be~~ is connected
to allow control of the apparatus, reconfigure the apparatus,
diagnose the apparatus and/or download or upload music data,
which ~~can be~~ are processed or stored in internal memory ~~form~~ for
future use.

18. (currently amended) Apparatus as claimed in claim 1,
~~wherein~~ in which the remote control means ~~can be~~ is used to
control the peripheral signal source apparatus, such as a
~~compact disc player~~ via the pre-amplifier apparatus.

19. (currently amended) Apparatus as claimed in Claim 1,
~~wherein~~ in which digital switching means are employed to route
and transfer data from different sub-blocks, card modules and
~~or deviees~~ in the apparatus.

20. (currently amended) Apparatus as claimed in claim 19,
~~wherein~~ in which the digital switching means takes the form of
a cross bar switch or a self-routing switch in which data
packets or cells have an appended routing tag to control the
flow of the ~~packet~~ packets or ~~cell~~ cells through the self-
routing switch to its their destination.

21. (currently amended) Apparatus as claimed in claim 20,
wherein ~~in which~~ the digital switching means uses priority output queues to allow data with different priorities to be queued in separate queues to reduce congestion and head of line blocking.

22. (currently amended) Apparatus as claimed in Claim 19,
wherein ~~in which~~ digital data for transfer via switching means is encapsulated as a variable length data packet or same length cell.

23. (currently amended) Apparatus as claimed in Claim 1, ~~that~~ incorporates ~~further comprising~~ an integrated ~~read and~~ ~~optionally write able~~ read/writable compact disc transport and associated control circuitry to allow stored ~~digitised~~ digitized audio data to be read and/or written to a compact disc (CD)-media.

24. (currently amended) Apparatus as claimed in Claim 1, ~~that~~ incorporates ~~further comprising~~ an integrated ~~read and~~ ~~optionally write able~~ read/writable Digital Versatile Disc (DVD)-transport and associated control circuitry to allow stored ~~digitised~~ digitized audio data to be read and/or written to a Digital Versatile Disc (DVC))-media.

25. (currently amended) Apparatus as claimed in Claim 1,
~~wherein peripheral units are situated remotely from the~~
pre-amplifier apparatus in which control and data messages are
transferred by wireless means allowing movement of the said
remote peripheral units to different locations ~~within the~~
~~use's house without the need to re-wire the apparatus.~~

26. (currently amended) Apparatus as claimed in Claim 3,
wherein the mezzanine ~~cards and~~ or card modules incorporate
"Plug and Play" means to allow a mezzanine ~~card and~~ or card
module to configure and ~~initialise~~initialize itself and
interact with the host processor ~~means~~ to indicate the
configuration, status and functionality of the ~~card module and~~
~~associated mezzanine~~ or card modules.

27. (currently amended) Apparatus as claimed in Claim 3,
wherein the mezzanine ~~cards and~~ or card modules incorporate
~~the~~ means to be hot swappable, allowing card module insertion
or removal from a card frame of the apparatus ~~card frame~~ while
the apparatus is operational.

28. (currently amended) Apparatus as claimed in Claim 1,
~~wherein in which the apparatus can have some of the logic~~
~~devices are~~reprogrammable ~~circuitry~~ configured to implement

functions and ~~or~~-algorithms normally performed in "conventional" peripheral equipment, allowing new peripheral equipment which operates with ~~the~~-said modular and software definable pre-amplifier apparatus to have reduced functionality.

29. (currently amended) Apparatus as claimed in Claim 1,
~~wherein in which the apparatus can be~~ programmed to record data using "non-volatile" memory means at a predefined time from a peripheral device ~~so it can be retrieved, processed and listened to at a later time.~~

30. (canceled)

31. (new) Apparatus as claimed in claim 1, wherein said software definable logic blocks include digital signal processor devices and associated memory devices, the configuration and allocation of the software programs used by each digital signal processor device being performed in real time or non real time by the host processor or configuration routines stored in non-volatile memory associated with the digital signal processor devices, the allocation of the specific software program being determined by user inputs.